

Machine Learning - Based Web Application Documentation

1. Introduction

1.1 Overview

Welcome to our machine learning-powered web application, designed to supercharge your data analysis and data science projects. Our mission is to simplify complex data science tasks and empower users to explore, analyse, and model their data effortlessly. 

1.2 Objectives and Goals

Our primary objectives are to eliminate coding hassles and help users:

- Automate redundant data science tasks. 
- Effortlessly analyse and visualize data.  
- Simplify data preprocessing. 
- Train machine learning models without coding.  
- Save and interpret their models with ease. 

2. Accessing the Application

2.1 Web-App Link

You can access our application through the following link: [Web-App Link](#). 

(Works best in **Laptop/Desktop** or in **Mobile phones** with **Horizontal screen** 

2.2 YouTube Tutorial

For a detailed step-by-step guide, check out our YouTube tutorial: [YouTube Tutorial](#). 

2.3 Guest Access

We offer a seamless experience where you can continue as a guest without the need for account creation. 

3. Application Workflow



3.1 Data Upload

To embark on your data analysis journey:

- **Upload Your Data:** Simply upload your dataset in CSV format. It's quick and easy!

The screenshot shows the application's interface. At the top, there is a navigation bar with links for 'ML GYM', 'Home', 'Upload', 'Profile', 'SIGN OUT', and a user profile icon for 'ammar'. Below the navigation bar, there is a section titled 'DATASET UPLOAD' with a file input field labeled 'Choose file' and 'No file chosen (.csv)', and a blue 'UPLOAD' button. Underneath this, there is a section titled 'EXISTING DATASET' containing four cards: 'Titanic' (Predict whether a passenger in Titanic will survive or not), 'Car Purchase' (Predict whether a customer will purchase a car or not), 'House Price' (Predict California house prices), and 'Salary' (Predict Employee Salary based on experience and qualification). Each card has 'UPLOAD' and 'DOWNLOAD' buttons.

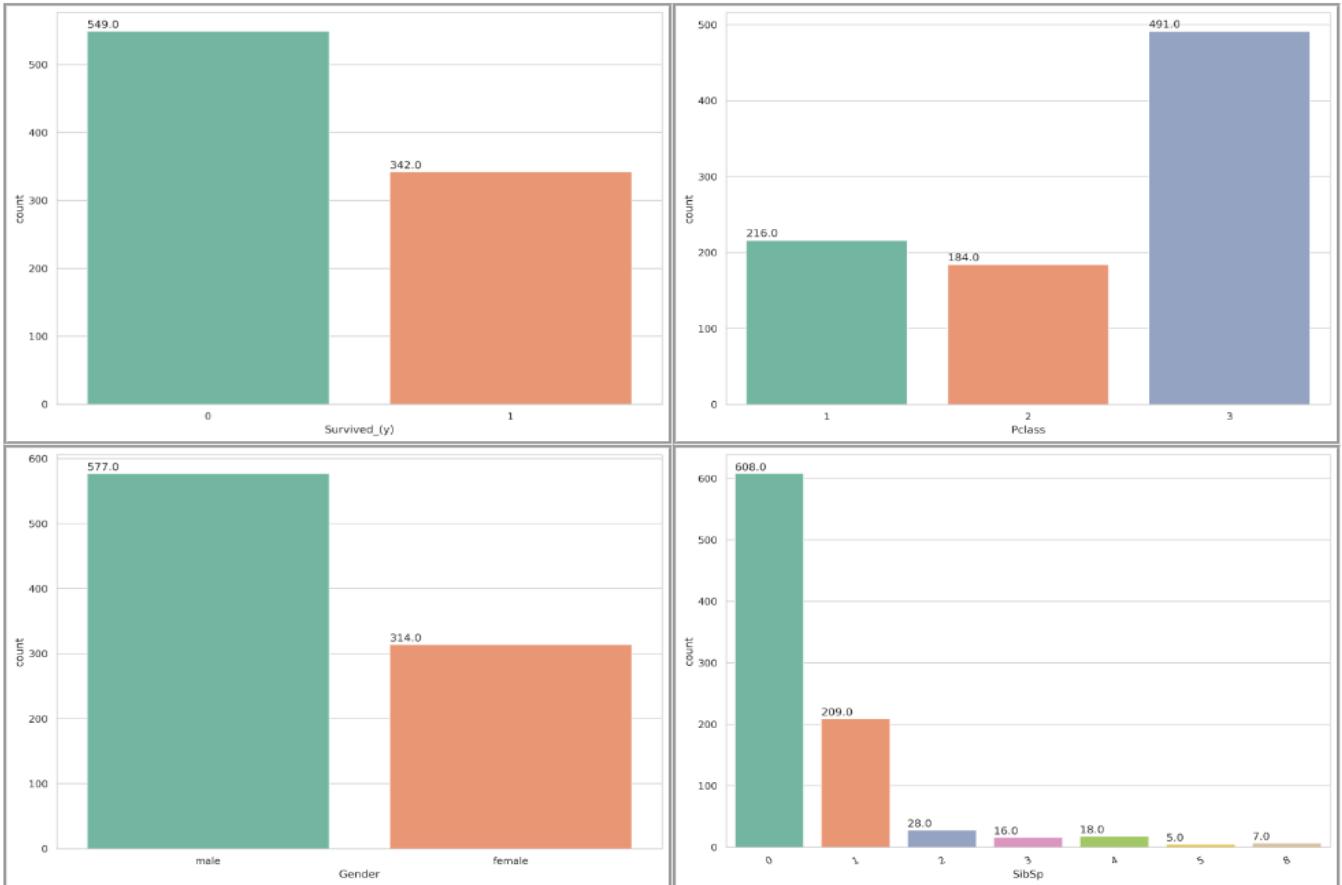
3.2 Explore Your Data

Our application swiftly analyses your dataset and provides:

- **Insightful Visualizations:** Explore your data with ease through textual, tabular, and graphical visualizations.

The screenshot shows the application's interface. At the top, there is a navigation bar with links for 'ML GYM', 'Home', 'Upload', 'Profile', 'SIGN OUT', and a user profile icon for 'ammar'. Below the navigation bar, there is a section titled 'EXPLORATORY DATA ANALYSIS (EDA)' containing a list of bullet points: 'Your data has 891 rows and 12 columns' and 'The column names are: PassengerId, Survived_(y), Pclass, Name, Gender, Age, SibSp, Parch, Ticket, Fare, Cabin, Embarked,'. Underneath this, there is a section titled '10 DATASET ROWS' displaying a table with 10 rows of data from the Titanic dataset. The table has columns for 'PassengerId', 'Survived_(y)', 'Pclass', 'Name', 'Gender', and 'Age'. The data includes entries like Slabenoff, Mr. Petco (male, NaN), Hansen, Mr. Henry Damsgaard (male, 21.0), and Norman, Mr. Robert Douglas (male, 28.0).

PassengerId	Survived_(y)	Pclass	Name	Gender	Age
602	0	3	Slabenoff, Mr. Petco	male	NaN
624	0	3	Hansen, Mr. Henry Damsgaard	male	21.0
548	1	2	Padro y Manent, Mr. Julian	male	NaN
10	1	2	Nasser, Mrs. Nicholas (Adele Achem)	female	14.0
680	1	1	Cardeza, Mr. Thomas Drake Martinez	male	36.0
297	0	3	Hanna, Mr. Mansour	male	23.5
157	1	3	Gilnagh, Miss. Katherine "Katie"	female	16.0
22	1	2	Beesley, Mr. Lawrence	male	34.0
564	0	3	Simmons, Mr. John	male	NaN
563	0	2	Norman, Mr. Robert Douglas	male	28.0



3.3 Effortless Data Preprocessing

- Handle Missing Values:** Use radio buttons to handle missing data effortlessly. 📈
- Train-Test Split:** Set your train-test split ratio with an intuitive slider. 🔍
- Select Dependent Variable:** Easily choose the dependent variable from a dropdown menu.

ML GYM Home Upload Profile [SIGN OUT](#) ammar

DATA PRE-PROCESSING

- Select the column you want to predict :

- Select the columns you want to drop:

 PassengerId Survived_(y) Pclass Name Gender Age SibSp Parch Ticket

 Fare Cabin Embarked

- Handle NULL values in dataset ①

Cabin (687 Rows)	<input checked="" type="radio"/> bfill	<input type="radio"/> ffill	<input type="radio"/> 0	<input type="radio"/> delete records		
Embarked (2 Rows)	<input type="radio"/> bfill	<input checked="" type="radio"/> ffill	<input type="radio"/> 0	<input type="radio"/> delete records		
Age (177 Rows)	<input type="radio"/> mean	<input type="radio"/> median	<input type="radio"/> bfill	<input checked="" type="radio"/> ffill	<input type="radio"/> 0	<input type="radio"/> delete records

80 %

- Train and Test split ratio:

3.4 Train Your Model

With just a few clicks, you can create your machine learning models using various algorithms:

- **No Coding Required:** Select a model from the dropdown menu containing several ML Algorithms and click to train. 

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Model "Decision Tree Classifier" has been trained successfully! 

MACHINE LEARNING

Decision Tree Classifier	MODEL TRAINING	MODEL EVALUATION			
Decision Tree Classifier					
(AutoML) Regression	Age	SibSp	Fare	Survived_(y)	Survived_(y) (Predictions)
Linear Regression	38.00	0	7.8958	0	1
(AutoML) Classification	38.00	1	26.0000	1	1
Logistic Regression	38.00	0	7.2500	0	0
KNeighbors Classifier	2	1	21.00	2	0
Random Forest Classifier	3	1	30.50	1	0
GaussianNB Classifier	3	1	30.00	1	0
SGD Classifier	3	2	15.00	1	0
	2	1	27.00	0	0

- **Model Evaluation:** See immediate model evaluation to assess its performance. 

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ML MODEL EVALUATION

Metrics	Values
Model	Decision Tree Classifier
Accuracy Score	79.33 %
Recall Score	73.68 %
F1 score	69.42 %
Precision	65.62 %

Click here to save the model:

SAVE MODEL

Click here to choose different model:

CHOOSE MODEL

3.5 Save Your Model



Once you've perfected your model:

- **Effortless Saving:** Save it for future use and interpretation.

The screenshot shows a dark-themed web application header with 'ML GYM' and navigation links 'Home', 'Upload', 'Profile'. On the right is a 'SIGN OUT' button and a user profile icon labeled 'amar'. Below the header is a light blue card with the text 'Titanic Project'. At the bottom left of the card is a dark blue button labeled 'SAVE PROJECT'.

The screenshot shows the same application interface as above, but with a green success message banner at the top stating 'Your Project has been saved successfully!' with a close button 'X' on the right. The 'Titanic Project' card and 'SAVE PROJECT' button are visible below.

- **Model Testing:** Access your saved models in your profile for testing on custom inputs.

The screenshot shows the application's main content area titled 'PROJECTS'. It displays three projects in cards: '2' (TEST MODEL, DELETE), '1' (TEST MODEL, DELETE), and '3' (TEST MODEL, DELETE). The project '1' is labeled 'Titanic Project'.

3.6 Interpret Your Results

Gain valuable insights into your model's predictions and understand how it makes decisions:

- **In-App Analysis:** Dive into your results and interpret them right within the application.  

ML GYM Home Upload Profile SIGN OUT ammar

Titanic Project

Pclass
1

Gender
male

Age
56

SibSp
12

Fare
220

PREDICT

Target Variable	Prediction
Survived_(y)	1

3.7 Future Improvements

Here's what's coming up next in our exciting roadmap:

- **Graphical Analysis**  : Users will soon be able to craft custom graphs between various dataset columns for in-depth insights at the click of a button.  
- **Tabular Analysis**  : Get ready to interact with your dataset using conversational queries that will return neatly organized tables filled with your data.   
- **Custom Preprocessing**  : We're introducing tools to help you easily identify and remove outliers from your dataset's columns, ensuring cleaner data for analysis.  
- **ML Parameters Selection**  : Tinker to your heart's content with machine learning model parameters for a tailored and optimized predictive model.  
- **Forecasting**  : Extend your predictive prowess beyond Regression and Classification models; soon, you'll be able to train and test Forecasting models for a glimpse into the future trends.  